

PATENT SPECIFICATION

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(54) DEVICE FOR CLEANING THE COOLING OIL FOR SPRAYED OIL COOLED ELECTRICAL MACHINES

(71) We, LICENTIA PATENT-
 VERWALTUNGS-GMBH, of 1 Theodor-
 Stern-Kai, 6 Frankfurt 70, Federal Republic
 of Germany, a German Body Corporate, do
 hereby declare the invention, for which we
 pray that a patent may be granted to us, and
 the method by which it is to be performed,
 to be particularly described in and by the
 following statement:—

The invention relates to a device for
 cleaning the cooling oil for oil spray cooled
 rotary electrical machines, particularly
 generators, in vehicles using the oil present
 for lubrication and cooling.

According to the invention, there is
 provided a device for cleaning the cooling
 oil for oil spray cooling of rotary electrical
 machines, said device comprising a hollow
 shaft adapted to receive the rotor of an
 electrical machine, a centrifugal separator
 provided in said hollow shaft, and a series of
 spray nozzles extending radially from the
 shaft for delivering cooling oil in the form of
 a spray to the machine, wherein the centri-
 fugal separator has a turbulence nozzle
 rotating with the hollow shaft at the input
 end of said separator, said nozzle com-
 prising at least one first opening which is
 inclined to the axis of rotation of the shaft
 and a central second opening arranged
 coaxially with respect to the shaft axis
 through which cleaned oil for spraying is
 passed from the separator to the spray
 nozzles.

The invention will now be further
 described, by way of example, with reference
 to the drawing, the single figure of which is a
 sectional view showing one embodiment of
 a device according to the invention em-
 bodied in a generator.

An oil spray cooled, brushless 3-phase
 current generator will be described as
 example. A lamination stack 2 having a
 main stator winding is contained in a
 housing 1. A field winding 3 of an exciter
 and a stator winding 4 of a permanent

magnet generator are arranged on the right
 and on the left respectively next to the main
 stator winding. A stack of main rotor
 laminations 7 with a field winding, a stack of
 rotor laminations with a winding 8 of the
 exciter and a permanent magnet rotor 10 are
 mounted on a hollow shaft 6 which is
 adapted to receive these components.
 Exciter diodes 9 are secured to the exciter
 rotor. The hollow shaft 6 is supported in a
 bearing 11 on the non-driven end of the
 generator. Cooling channels in the housing 1
 are given the reference numeral 5. In ac-
 cordance with the invention a centrifugal
 separator 12 is provided at the passage of
 the cooling oil from the housing into the
 rotor.

The cooling oil operation is as follows:

The total cooling oil enters the housing at
 a connection 13 and runs round in the
 housing in a helix in known manner. On
 leaving the housing it enters a tube 14 which
 conveys it to the end of the shaft 6 where it
 enters the centrifugal separator 12 by means
 of openings 15 distributed at the periphery
 of a turbulence nozzle. The openings 15 are
 outwardly inclined with respect to the axis
 of the hollow shaft 6 so that the oil is put
 into a circulation flow which centrifuges the
 dirty parts outwardly so that in the centre
 the clean oil is drawn off through central
 opening 16 in the turbulence nozzle and is
 guided through a channel 17 into the hollow
 shaft to openings 18 in the form of spray
 nozzles from where it is sprayed for cooling.

The dirty part of the oil is conducted
 further in the conically constructed centri-
 fugal separator 12, wherein the cone must
 be constructed as flatly as possible so that
 the dirty parts are carried further because of
 the flow. The dirty oil is then guided through
 the hollow shaft 6 to an outlet 19 in a pinion.
 The cooling oil sprayed in the inner space of
 the generator is led away by means of a
 channel 20.

In the case of a sufficient quantity of

primary oil being available, it is also conceivable to connect two centrifugal separators one after the other.

WHAT WE CLAIM IS:—

- 5 1. A device for cleaning the cooling oil for oil spray cooling of rotary electrical machines, said device comprising a hollow shaft adapted to receive the rotor of an electrical machine, a centrifugal separator
10 provided in said hollow shaft, and a series of spray nozzles extending radially from the shaft for delivering cooling oil in the form of a spray to the machine, wherein the centrifugal separator has a turbulence nozzle
15 rotating with the hollow shaft at the input end of said separator, said nozzle com-

prising at least one first opening which is inclined to the axis of rotation of the shaft and a central second opening arranged coaxially with respect to the shaft axis through which cleaned oil for spraying is passed from the separator to the spray nozzles.

- 20 2. A device for cleaning the cooling oil for oil spray cooling of rotary electrical machines, said device being substantially as described herein with reference to the accompanying drawing.

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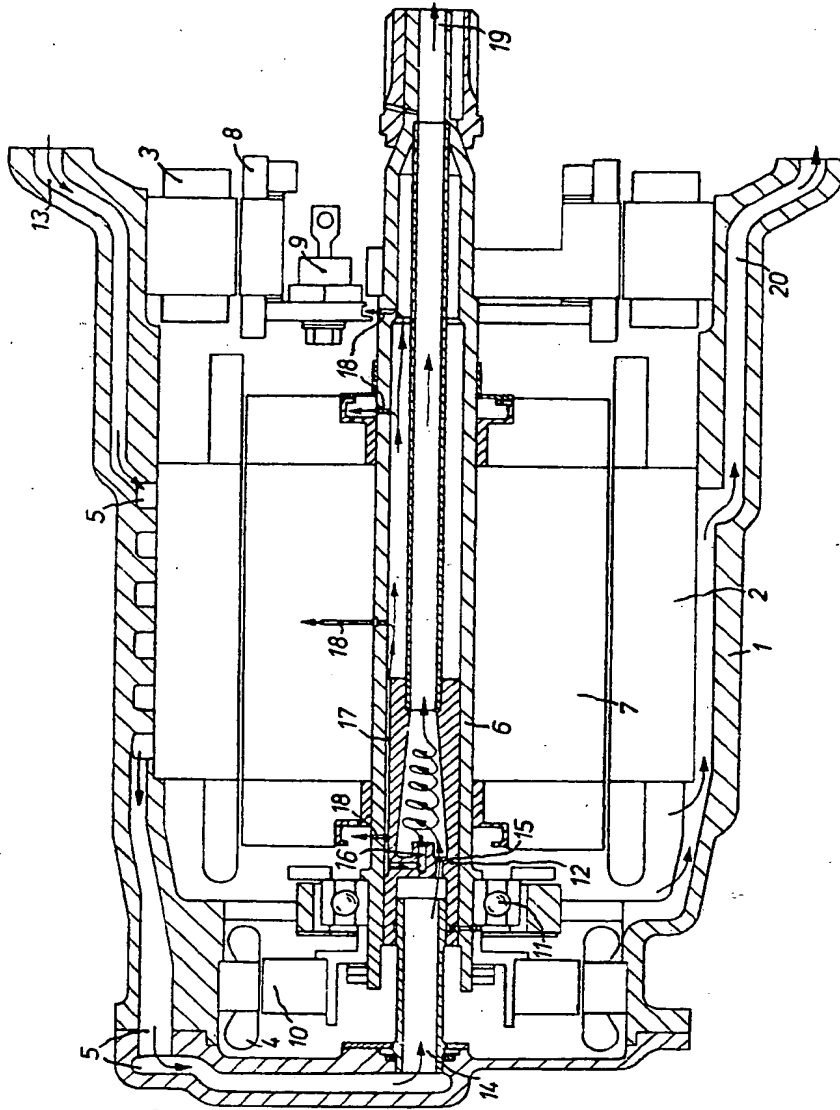
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COMPLETE SPECIFICATION

1 SHEET

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the Original on a reduced scale*



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